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ORIGINAL ARTICLES.

FURTHER OBSERVATIONS ON TUMORLIKE HYPERPLASIA OF THE PALISADE CELLS OF THE PARS CILIARIS RETINÆ.

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In a former paper on intraocular epithelial newformations (this Journal Vol. XIX, No. 4, April, p. 97), I described a number of instances of what I called intraocular epithelial tumors, that is, tumors which took their origin from pre-existent intraocular epithelial structures.

I had occasion there to speak of the different forms of hyperplasia of the epithelial lining of the ciliary body and its processes. I have since then seen a number of cases in which very similar conditions were found, only considerably further progressed, and some in which the unpigmented cells of the pars ciliaris retinæ seem alone to have taken place.

The most frequent appearance is that of the now well-known solid cylinders of the unpigmented cells, as found particularly in injured eyes with dense cyclitic membranes. In Figure 4 in the paper referred to is shown such a specimen in which the many solid unpigmented cell cylinders together attain almost the size of a tumor. Yet, each cylinder seems to remain intact by itself and separate from its neighbors, although there is very little connective tissue between. The shape of the cells is changed, so that they could hardly be recognized as the palisade cells of the ciliary body, if the cylinders were not found attached to the tissue from which they sprang. This is, however, a picture which is not so very rare, although not often quite as far progressed as in the case from which I took this specimen.

The outgrowth of the nonpigmented cells of the ciliary body is much more massive in the eye from which Figures 1 and 2 are taken. This was, also, an injured eye in which the detached retina and ciliary body were matted together by a dense cyclitic membrane to the front of which some remnants of lens tissue and lens capsule were, also, attached. In this cyclitic membrane lie numerous solid cylinders made up solely of the cells of the pars ciliaris retinæ. None are pigmented in the slightest. They have assumed all sorts of shapes in their outgrowth and in longitudinal section are seen each to consist of two parallel rows of palisade cells; the nuclei lying to the outer surface of the cylinder

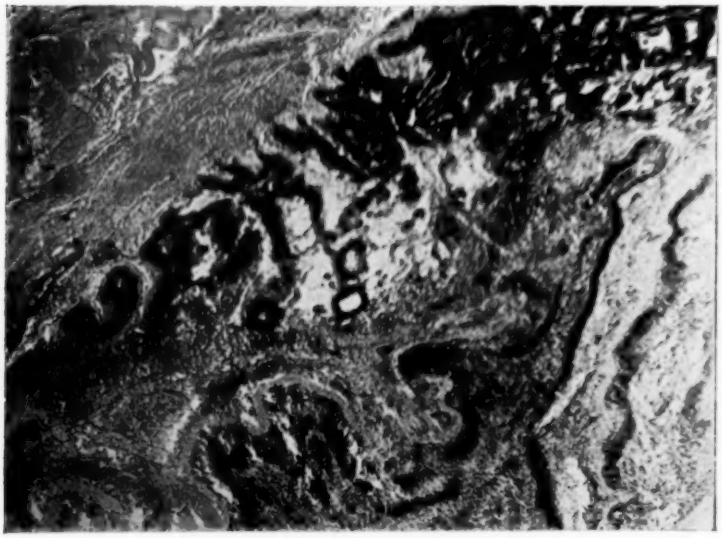

Fig 1.—Cyclitic membrane in which are embedded numerous solid cylinders of palisade cells, a few tubules in the center. Below is detached and degenerated retina. Above to the left wrinkled lens capsule.

where these two rows of cells are in contact with each other in the interior of the cylinder a line of demarkation can easily be made out. A few of the cylinders have a distinct lumen, that is, form tubules; but these are not numerous, and it appears as if this apparent lumen was, perhaps, due to a degenerative process and regressive metamorphosis of the cells composing these particular cylinders. It is difficult to assume that the formation of these cell cylinders is simply due to traction from the shrinking ciliary membrane. It seems to me that from the enormous quantity of these cylinders we must assume an independent mul-

tiplication of the cells which probably had either during the injury or later become detached from their natural position. In this particular it is peculiar that, unlike the outgrowth in Figure 4 of the former paper, the cells have retained their normal shape in a great measure and have evidently grown, so to speak, side by side, forming palisades as in the norm, only that there are always two rows of such cells, their nuclei lying at the outer side.

These cylinders lie more or less closely to the center of the cyclitic membrane and are not in contact with the remainder of the ciliary body and the pigment epithelium. As stated before, they

Fig. 2.—A small part of Fig. 1 enlarged. It shows that the cell cylinders in longitudinal sections consist of two rows of cells touching each other with their inner ends, the nuclei lying outwards. A cylinder cut transversely (to the right) shows a central lumen partly filled with detritus. It appears as if the cells were proliferating.

probably have taken their origin from detached parts of the pars ciliaris retinæ.

In another specimen, shown in Figure 3, similar cylinders have formed an almost tumor-like outgrowth, also, within a cyclitic membrane. While in a general way the cylinders are arranged in a like manner, the nuclei of their palisade cells do not always lie outwards, as in the previous specimen; in a number of cylinders they lie inwards where the two lines of cells come together. But in these cylinders the two lines of cells seem to be separated from each other by a small amount of connective tissue.

Yet, in all these cylinders, too, the palisade arrangement of the cells, standing side by side, is easily recognized.

That this continuous outgrowth can, when the conditions permit, go on much further may be seen from Figure 4. It is taken from a very old specimen, cut with the hand and stained with carmine some thirty years ago, which, therefore, did not lend itself very well to photography. It was, also, taken from an injured eye all the tissues of which were more or less degenerated and conglomerated in an almost solid manner. Within this mass of connective tissue there lies the herd depicted in Figure 4, which consists of single rows and cylinders of all sorts of shapes

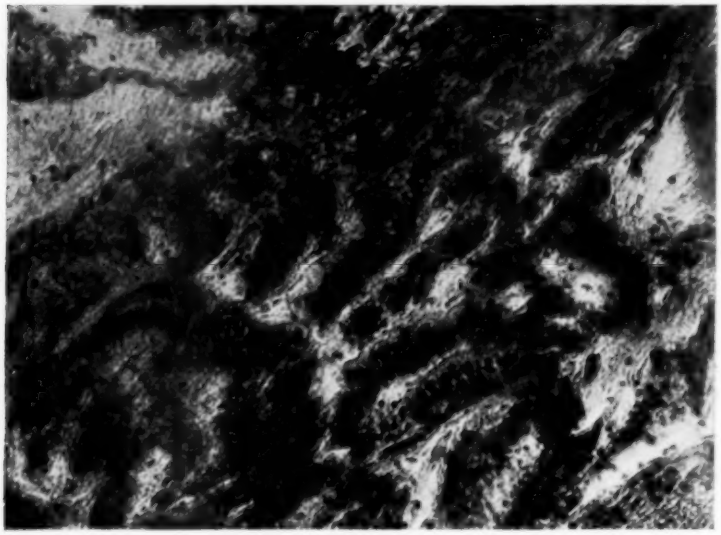

Fig. 3.—Palisade cell cylinders, some solid with the nuclei outwards, some in which the nuclei lie inwards and in which the two rows of cells are separated by a small amount of connective tissue.

and convolutions, made up altogether of the palisade cells of the pars ciliaris retinæ. The cylinders are separated or held together by varying amounts of connective tissue. These cells are easily distinguished as to their provenience since they are throughout arranged side by side like palisades. Evidently, they had by the injury or afterwards become detached and then grown out in these bands and cylinders which form the picture shown in Figure 4.

Small vesicle-like detachments of the par ciliaris retinæ others and I have seen, and also described in numerous cases, but these have usually been due to some exudate which lifted the cells off

the pigment epithelium. Larger detachments often accompany a general retinal detachment. It seems hardly possible that the pars ciliaris retinæ could by any accident have become detached almost as a whole, or at least to such an extent, that the thus loosened and folded membrane could produce a picture like this. Although this might, perhaps, be the explanation, it rather seems, as if a newformation of the palisade cells alone could produce a condition as here described.

That considerable portions of the pars ciliaris retinæ may become detached as a continuous membrane and retain their vitality

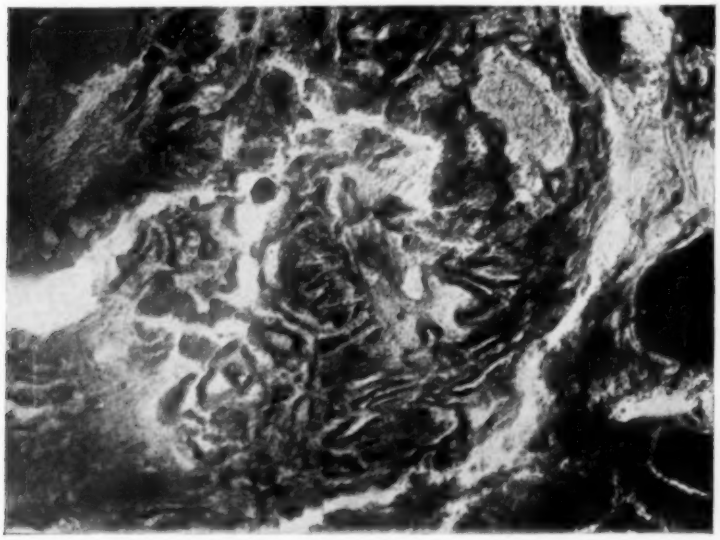

Fig. 4.—Photographed with a much lower magnifying power. The bands of cells and cell cylinders bent in a manifold manner consist of nothing but palisade cells growing one beside the other as in their normal position on the inner surface of the ciliary body.

although enclosed in a cyclitic membrane can be seen from Figures 5 and 6.

The specimen is taken from an eye lost by panophthalmitis after an injury. The detachment of the pars ciliaris retinæ seems to have been in the shape of a continuous membrane which has been thrown in a number of folds. The folding occurred in such a manner that the cells lie opposite each other with the bases, while in the other cases they touched each other with their inner ends. They are evidently cells from farther back, nearer the ora serrata, than the palisade cells in the other specimens, being considerably longer.

It is seen from these specimens that not only an inflammatory hyperplasia of the cells of the pars ciliaris retinæ can rise almost to the dignity of a benign tumor, but that probably detached portions of this membrane may not only retain their life under rather adverse circumstances, but even keep on growing until they form a very considerable tumor-like mass, as seen in Figure 4, without the cells losing their characteristic arrangement side by side like palisades.

This seems to be a peculiar fact and seems to be due to the epithelial (epiblastic) character of these cells.

Fig. 5.—A large fold of the palisade layer of the ciliary detached in the shape of a membrane and enclosed in a cyclitic membrane. The cells seem to show by their size that this part was torn off from near the ora serrata. Below detached retina. Above crystalline lens.

In Graefe's Archiv, Vol. LXXXVII, part 2, A. Elschnig has reported a primary tumor which he calls a neurinoma or neurocytoma retinæ, and which "has certain connections with the tumors of the unpigmented epithelium of the ciliary body."

The tumor consisted chiefly of thin tracts of fibrous tissue crossing each other in all directions, in which are embedded in equal density spindle shaped and oval, rarely round nuclei, which took up the nuclear stains but poorly. They are arranged concentrically as would correspond to the arrangement in an endothelioma. This tumor starts from the ora serrata and the palisade

cells are seen to directly pass over into the peculiar ones forming the tumor.

Elschnig believes this to be a true neoplasm of the cells of the inner part of the secondary ocular vesicle, and accepts Verocay's views according to which such tumors may be derived from formative nerve cells from which glia cells, ganglion cells and nerve fibres are formed. Hence the name of neurocytoma or neurinoma.

The fact that, as we have seen, the palisade cells retain their characteristic shape under very peculiar circumstances, and in

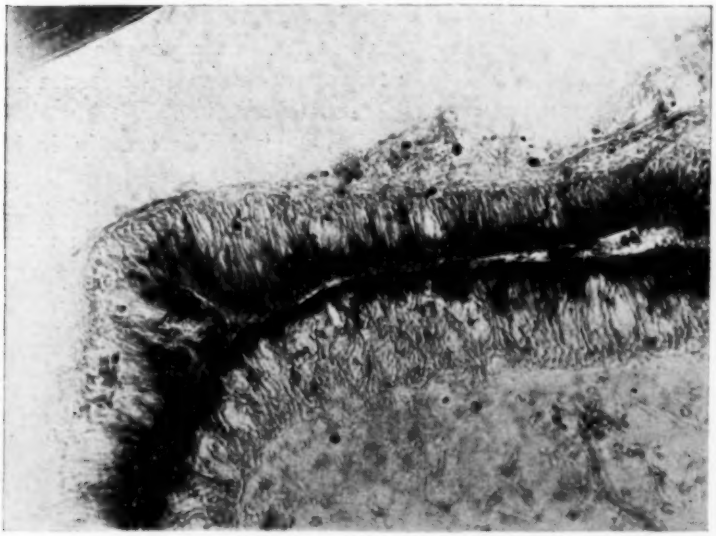

Fig. 6.—A part of this folded membrane under higher power. Here the outer ends of the palisade cells containing the nuclei face each other, the rows of cells are separated by a small amount of connective tissue. The palisade cells themselves show changes as we find them often after the opening of the anterior chamber.

proliferation even, seems to prove that Elschnig's tumor is, perhaps, a congenital one and that the peculiar cells which form it have never reached the stage of development in which they would have formed a normal layer of palisade cells.

THE ACTION OF OPTOCHIN IN BLENNORRHOIC CONJUNCTIVITIS.

(From Dr. G. Stanculeanu's Eye Clinic in Budapest.)

By Dr. Elena Puscariu.*

The physiological action of this new derivate of quinine, called æthylhydrokuprein or optochin, which has already been applied in ophthalmology since the papers by Morgenroth, Ginsberg, Goldschmidt, Schur, Darier, Holk and Kuemmel, is well known.

The experimental and clinical studies of these authors have shown that this substance, as well in vitro on cultures as in vivo in infected mice and in man in serpiginous ulcer of the cornea due to pneumococcus, has a strong bactericidal action.

Professor Stanculeanu has, also, applied this remedy in his clinic with the best results in pneumococcus ulcers.

From the fact that quinine had long been used in the treatment of gonorrhœa of the urethra, we were actuated in trying the use of optochin in gonorrhoic conjunctivitis, the more since optochin has a much greater bactericidal action than quinine.

In our first case of gonorrhoic conjunctivitis treated with optochin we found the result so favorable that we have since used it in all cases.

Gonorrhoic conjunctivitis in Roumania is very rarely seen in the adult, but very frequently in the newly born, since the prophylaxis is very unsatisfactory. Yet, in spite of this we have not often occasion to treat such cases clinically. The peculiar reason for this is the following: Although the disease is widely spread among the poorer classes, the mothers of this class from religious scruples will not leave the house earlier than six weeks after the confinement and are satisfied to have the child treated with remedies recommended by the old women.

But rarely, and then in about from two to four weeks, they decide to come to a hospital. This happens almost altogether only in the capital and larger cities, for from the province and from the country infants with gonorrhoic conjunctivitis are hardly ever brought to a clinic. Even the women in the cities often refuse to enter a hospital.

In consequence, although a sufficient number of cases come for consultation, very few cases of blennorrhoic conjunctivitis

*Klin. Mtsbl. f. Augenhl., September, 1914.

enter the clinic for treatment. This is the more important since exact statements regarding a mode of treatment can be made only when this is applied under control to patients who have been received in a hospital and, in such a manner that the result can in no way be influenced by other remedies (home and folk remedies), as is so often the case in private practice.

In consequence of all this we have had only eight cases under treatment in the last months (February to May). The good results obtained in all of these eight cases with optochin, prompt us to publish them with the hope that other oculists will use this new remedy in cases of gonorrhoic conjunctivitis. The larger number of results may then determine the real value of this mode of treatment.

We have used optichinum hydrochloricum in 1 per cent. and 2 per cent. solutions. The 1 per cent. solution was instilled every hour, the 2 per cent. one every 2 hours. The lids were everted when the instillation was made and held in this position exposed to the fluid for one minute. These instillations must be preceded by plentiful washing (boric acid solution or collyrium luteum) in order to thoroughly remove all secretion.

We have observed no symptoms of intoxication in reality not even the slightest irritation with this treatment. The children nurse vigorously, and their general well being is in no way altered.

In every case a microscopical examination of the secretion was made in the morning before washing and instillation.

Case I.—F. F., 15 years old, girl, companion to an infant received at the clinic three weeks ago on account of gonorrhœal conjunctitivitis, which had been treated by the classical method with nitrate of silver.

On February 8th, 1914, the girl complained of a sandy feeling and lacrimation of the right eye.

February 10th. Great œdema of the upper lid, which is bluish and drooping. The palpebral conjunctiva is œdematous, greatly injected; there is a great deal of sero-purulent secretion with many intracellular and extracellular gonococci. Instillation of 2 per cent. optochin three times a day.

February 11th. Œdema almost gone, little secretion. A few floccules swim in the tears; œdema and congestion of conjunctiva very much reduced. Only a few gonococci can be found in the floccules. Treatment the same.

February 12th. No more œdema of the lid. Conjunctiva of

lower lid almost normal, that of the upper lid very little thickened. In a small floccule (there is no more secretion) a few cells are found which contain two or three gonococci.

February 13th. No secretion; lid and conjunctiva almost normal. In the fluid taken from the conjunctiva only squamous epithelial cells and a few polymorphonuclear cells are found, no gonococci.

February 14th. Everything normal, no secretion, no gonococci.

An examination a few days later shows a perfect cure.

In this case the gonorrhoic conjunctivitis had lasted 48 hours and was accompanied by intense symptoms (great œdema, seropurulent secretion); appeared almost cured after 2 per cent. optochin had been instilled three times for one day, and after three days' treatment the gonococci had disappeared altogether.

Case II.—S. G., infant, 5 weeks old, entered the clinic on February 12th. On the fourth day after birth the secretion from the eyes had begun. Was treated at home by simple washing out with water.

Status præsens.—Lids somewhat œdematous, lashes sticking together. When the lids are separated a large quantity of purulent secretion runs out; conjunctiva thickened, velvety, red and folded.

Numerous cells filled with gonococci.

Optochin 2 per cent. 3 times daily.

February 13th. Eyes open, a little secretion still in the lashes; when the lids are turned no secretion is seen; only a very little fluid can be taken from the conjunctival surface, which contains few cells with gonococci.

The same condition on the following day, secretion almost gone, so that the nurse is careless about the instillations.

February 17th. More secretion and more gonococci in the pus.

2 per cent. optochin three times a day.

February 18th. Secretion almost gone. Only two to three cells containing gonococci in each smear.

February 19th. The same. Against our advice the mother left the hospital, being satisfied with the child's condition.

A few cells with gonococci showed the cure was not yet perfect.

In this case we had a gonorrhoic conjunctivitis of four weeks' duration with profuse secretion which disappeared almost totally after three or four days' treatment.

Case III.—P. G., two weeks old, was entered on March 1st.

Seven days after birth secretion had appeared in the left eye and three days later in the right eye. For three days great œdema, so that eyes cannot be opened voluntarily. Thus far the eyes had only been washed with water and boric acid solution.

Status præsens.—Lids very œdematous, swollen to the size of a nut. The left eye worse than the right one, red, inflamed; it is barely possible to separate the lids from each other; there is profuse secretion. Conjunctivæ thickened, dark red, bleeding; in the left some pseudomembranes in the tarsal region. In the left cornea a yellow, purulent infiltration over its whole area. In the right cornea a small point-shaped central infiltration.

Numerous cells filled with gonococci.

Optochin 1 per cent. every hour.

March 2nd. R.E., œdema almost gone, except at lid margin; secretion scant. L.E., œdema much reduced, lids still red; pseudomembranes thinner, the eyes can be opened. Corneal infiltration the same. Still numerous gonococci in the cells, but fewer. Same treatment.

March 3d. Œdema almost gone. Corneal infiltration unchanged. L.E., inflammatory symptoms very much reduced. Pseudomembranes almost gone. Corneal infiltration cleaner, iris lying against cornea. Little secretion, gluing lashes together in the morning.

March 4th. R.E., all inflammatory symptoms gone. Infiltration more transparent. L.E., swelling of lids and conjunctiva almost disappeared. Corneal infiltration grayish, more transparent. Almost no secretion. Very few gonococci.

March 5th. Improvement continues; eyes open.

March 6th and 7th. Very little secretion, which glues lashes together in the morning.

March 8th. Conjunctivæ almost normal. In a small quantity of fluid found in the right conjunctiva only two small foci of gonococci. L.E., the ulcer cleanses itself; little secretion in which there are few cells with gonococci.

March 10th. Eyes appear almost normal. Gonococci very scarce in fluid from R.E., a little more frequent in that from L.E.

March 12th. R.E., two hours after instillation of optochin no gonococci could be found on the conjunctiva. There is still a slightly opaque point visible in the cornea. L.E., still a few gonococci. Cornea somewhat deformed, grayish opaque, iris adherent. Mother of patient wants to be discharged.

The infant had a most severe gonococcus conjunctivitis and the treatment was begun at the time when the affection had reached its height, in the one eye seven in the other five days after its commencement. The treatment with optochin stopped the progress of the ulcer and infiltration which was very far advanced in the left cornea, and the beginning infiltration in the right cornea. After three days' treatment œdema, inflammation of the conjunctiva and secretion had disappeared almost altogether.

After twelve days the gonococci had gone altogether from the right eye, while in the left their number was so very much reduced that they probably would have disappeared, also, had the treatment been continued for about 2 days more.

Case IV.—C. N., entered one month after birth on March 16th. Secretion had begun right after birth and was not very profuse; the œdema, too, was slight.

Status præsens.—Lids not swollen, conjunctivæ thickened, papillary swelling. When the eyes are opened only a small quantity of secretion appears. There are intracellular and extracellular gonococci, but not many. Optochin 2 per cent. three times daily.

March 17th. No secretion. In the fluid from the conjunctiva only two groups of extracellular gonococci.

March 18th. On each conjunctiva one floccule in which polymorphonuclear cells and many epithelia, but no gonococci, are found.

Patient leaves the hospital.

This case was a mild one from the beginning, yet the secretion with gonococci had persisted for one month. After two days' treatment secretion and gonococci had disappeared.

Case V.—A. S., entered four weeks after birth, on March 22d. On the third day after birth the right eye had began to run, two days later the left one. There was great œdema and much secretion. Some collyrium was used. For about a week an improvement had been noticed.

Status præsens.—Slight œdema and redness of both lids, conjunctivæ much swollen and red, velvety and folded. Copious sero-purulent secretion in which numerous cells with gonococci are found, as, also, numerous extracellular groups. Optochin 1 per cent. every hour.

March 23d. Lashes glued together by secretion. R.E., when lids are separated but little secretion with floccules in which are

many gonococci. L.E., no secretion. Some fluid taken from the surface of the conjunctiva with a platinum loop shows but very few gonococci.

March 24th. Conjunctivæ pale, papillary but thinner; in the morning the lashes were slightly glued together. Two hours after the first instillation of optochin several floccules on the conjunctiva which are free from gonococci.

March 25th. Œdema of lids gone, they are less red; conjunctiva thin and less velvety. Before each instillation a little dried secretion is found in the lashes. The fluid is free from gonococci. Optochin 2 per cent. three times a day.

March 26th. The œdema has disappeared, conjunctiva thin. No secretion and no gonococci.

Child discharged .

In this case we had to deal with an intense gonococcus conjunctivitis. The treatment with optochin was begun when the inflammatory symptoms had begun to subside, yet there was still a profuse secretion. The cure with the disappearance of the gonococci was accomplished in three days.

In order to compare the results from optochin treatment with nitrate of silver treatment, we have in the following cases treated one eye after the classical method, the other with optochin.

Case VI.—E. D., 6 weeks olds, entered April 25th. Mother has fluor albus. The infant's eyes had begun to run three days after birth. The eyes had been washed with a solution of potassium permanganate, yet the secretion had not been reduced and continued profuse. The lids had never been much swollen.

Status præsens.—Slight œdema of both eyes. Lashes glued together by secretion. When the lids are separated profuse secretion escapes; conjunctiva thick, papillary. The corneæ are normal. Numerous intracellular gonococci, few extracellular ones.

R.E., optochin 2 per cent. every 2 hours; L.E., silver nitrate 2 per cent. twice daily.

April 26th. Œdema gone, little secretion, a little more in L.E., gonococci only in a few cells.

April 27th. R.E., no more swelling or secretion. L. E., slight œdema of the lids still present; when the lids are separated some secretion. No gonococci in either eye.

April 28th. Secretion and gonococci gone from both eyes, the left eye is still somewhat swollen and the conjunctiva is more moist.

In this case there was an old gonococcus conjunctivitis with considerable secretion. Under the treatment with optochin of one and nitrate of silver of the other eye the gonococci disappeared after two days. However, the inflammatory symptoms disappeared altogether with the optochin treatment, while with the nitrate of silver treatment they still persist to some degree.

Case VII.—E. G., one month old, entered April 20th. The eyes have been running for seven days and have thus far been treated. The last three days the infant has not opened the eyes.

Status præsens.—Weak infant of 6 pounds; has thrush. The lids are highly œdematous; much secretion, which in a dried state sticks to lids and face. When the lids are separated a large quantity of purulent secretion escapes. The conjunctivæ are red, thickened, but smooth. There is a small yellowish infiltration in the right cornea. Numerous intracellular and extracellular gonococci.

R.E., optochin 2 per cent. every 2 hours. L.E., silver nitrate 2 per cent. twice daily.

April 21st. R.E., œdema almost gone; dry secretion at lid margin. Very much less secretion on opening the eye, which is clearer and contains much fewer gonococci. L.E., still œdematous; less secretion, but much more than in R.E. Gonococci less numerous.

April 22d. Improvement continues in both eyes. Corneal infiltration stationary.

April 23d. Infant opens the eyes. Two hours after instillation of optochin the secretion in the right eye is very scant, serous, slightly opaque. Few intracellular gonococci, no more extracellular ones.

In the left eye, where secretion and œdema are more prominent than in the right, there are still numerous intracellular and extracellular gonococci.

April 24th. Only a few drops of fluid obtainable from the R.E., more from the L.E. Few gonococci in either.

April 25th. In the fluid taken from the R.E. only two cells with gonococci. The lids of the L.E. are still somewhat œdematous; more cells with gonnococci are found than in R.E.

April 26th and 27th, *status idem.*

April 28th. Scant secretion from either eye; a slight floccule in R.E., a little turbid fluid in L.E. The corneal infiltration in R.E. clearer.

On the mother's insistence the child is discharged. After two

days, in which the child had not even been washed by the careless mother, they returned to the clinic (May 1st).

The L.E. again showed a great deal of sero-purulent secretion and the R.E. a thicker, more flocculent secretion. Numerous intracellular and extracellular gonococci. Since the eye treated with silver nitrate showed again a profuse sero-purulent secretion, it was now, too, treated with optochin in 5 per cent. solution twice daily; in the right eye the 2 per cent. solution was used, as before.

May 2nd. In the R.E. a small floccule with intracellular and extracellular gonococci. L.E., still more sero-purulent secretion with numerous gonoocci.

May 3d. R.E., a small floccule in which two cells with gonococci and two small extracellular groups were found. L.E., no more sero-purulent secretion, but thicker, floccules than in the R.E. with some intracellular and extracellular gonococci.

May 5th. In either eye a very small floccule without gonococci. Corneal infiltration in the R.E. almost disappeared.

This was a case of gonorrhoic conjunctivitis at its fullest development. Improvement was more rapid with optochin, than with silver nitrate. Although the infant was not perfectly, but almost cured, there being still some gonococci. Treatment was interrupted. A relapse occurred with profuse sero-purulent secretion in the eye treated with silver nitrate, which after three days of optochin treatment was cured.

This case is especially important since it shows that we can count with certainty on a cure only when the gonococci have disappeared and not simply when the clinical symptoms of the disease are no longer present. Treatment must be continued until the gonococci are perfectly destroyed.

Case VIII.—F. G., five weeks old, entered May 5th. Three days after birth the eyes had begun to discharge; at first they were very much swollen. The last two weeks there was less swelling and they are slightly opened.

Status præsens.—Slight œdema of the lower lids, conjunctivæ red and swollen; profuse secretion in which numerous cells filled with gonococci are found. L.E., optochin 5 per cent. twice daily; R.E., silver nitrate 2 per cent every 2 hours.

May 6th. Less secretion, still numerous gonococci.

May 7th. Very little secretion in either eye. Conjunctivæ, paler, œdema very much reduced.

May 8th. Scant secretion. The L.E., still shows many cells filled with gonococci. No more gonococci in the R.E.

Since in spite of the 5 per cent optochin instillations made twice a day the left eye still contains gonococci, although all the clinical inflammatory symptoms have disappeared, the instillations are changed to a 2 per cent solution every two hours.

May 9th. R.E., no more secretion. With the platinum loop a little turbid fluid is taken from the conjunctiva in which no gonococci are found. There is a little more secretion in the left eye in which there are still some few gonococci. Both eyes treated with optochin, 2 per cent every two hours.

May 10th. R.E., no secretion; no gonococci. L.E., unimportant secretion; still some gonococci.

May 11th. *Status idem.*—Mother wants to leave hospital, so infant is discharged.

It is seen from this case of a five weeks old gonorrhoic conjunctivitis that after three days treatment with a 2 per cent. optochin solution instilled every two hours the R.E. was cured and the gonococci gone; that in the L.E. a 5 per cent. solution instilled twice daily, although greatly improved clinically, there still were many gonococci, and that 2 per cent. instillations every two hours brought about a cessation of secretion and reduced the number of gonococci to a minimum.

Our eight cases of gonorrhoic conjunctivitis can be divided into three groups according to the time when the optochin treatment was begun and their consequent course.

1. Case I, in which the optochin was used 48 hours after the beginning of the disease and in which in three days a cure and the disappearance of the gonococci was reached.

2. In this group belong cases III and VII, in which the optochin treatment was commenced on the fifth and seventh days; that is at a time when the symptoms of the disease had reached their height (inflammation and secretion). In the first of these cases the gonococci were gone from one eye after twelve days of treatment, while there were still some few in the fellow eye; in the second one they were altogether gone after fourteen days.

3. In the third group we put cases II, IV, V, VI and VIII, in which optochin treatment was commenced in from four to six weeks after the beginning of the disease, in its period of recession. In all of these cases a cure and the total disappearance of gonococci was effected; in cases IV and VI after two days, in cases V and VIII after three days of treatment. In case II, on account of carelessness, there were still some gonococci present after seven days.

It appears that the optochin treatment of gonorrhoic conjunctivitis produces a rapid cure in recent and receding cases, while in cases in which the disease is at its height (up to 14 days) treatment must be continued for a longer period in order to get rid of all gonococci.

All of the cases could from their clinical symptoms be considered as cured long before the gonococci had altogether disappeared. Only the absence of the gonococci in the secretion gives a sure criterion as to the cure.

We believe that all oculists will agree that a maximum of 14 days for the cure of the severest cases is comparatively very short. With nitrate of silver we have often had occasion to see cases lasting one to two months and longer.

Even when silver nitrate is used from the very beginning of the disease, as is done in the lying-in institutions, a cure is not obtained in most cases until after several weeks have elapsed. The corneal ulcers and infiltrations, the beginning ones as well as the farther progressed, under optochin treatment not only did not show any progress, but a considerable improvement.

From all this it is plain that the action of optochin on gonorrhoic conjunctivitis is superior to that of silver nitrate. It is furthermore preferable in practice because its application need not be made by the physician, as is necessary with silver nitrate.

From our experience we recommend the following mode of treatment: In cases with very profuse secretion and severe inflammatory symptoms hourly instillations of a 1 per cent solution, having previously washed off all secretion with boric acid solution or weak collyrium luteum. In this way 10 to 14 instillations are made during 24 hours.

When the secretion stops and the infant opens the eyes—be this due to the 1 per cent. optochin or any other remedy, or to the natural course in untreated cases—use after washing 2 per cent. optochin instilled every 2 hours.

The instillation must reach the whole surface. To this end we turn the eyelids and hold the conjunctiva for one minute exposed to the fluid.

Besides these clinical experiments with optochin, which we shall continue, we have also taken up the study of its effect on gonococci *in vitro* (on cultures).

Furthermore, one of our colleagues, a specialist in genito-urinary diseases, has at our instance undertaken to experiment with optochin in gonorrhœa of these organs.

LITERATURE.

Morgenroth and Halberstaedter. Kgl. Preuss. Akad. der Wiss., July, 1910, and January, 1911.
The same. Berlin Kl. Wochenschr., 1911.
Morgenroth and Rich. Levy. Berl. Kl. Wochenschr., 1911.
Morgenroth and Kaufmann. Zeitschr. f. Jmm. Forsch., 1912.
Gutman. Idem, 1912.
Morgenroth and Ginsberg. Berl. Klin. Wochenschr., 1912 and 1913.
Ginsberg and Kaufmann. Klin. Mtsbl. f. Augenhl., 1913.
A. Leber. 39 Heidelberg Ophth. Gesellsch., 1913.
M. Goldschmidt. Klin. Mtsbl. f. Augenhlk., 1913.
M. Schur. Klin. Janvier, 1914
Kuemmel. Muench. med. Wochenschr., 1914, June.
Holth. Nordisk med. Arch., 1914.

MEDICAL SOCIETIES.

TRANSACTIONS PHILADELPHIA POLYCLINIC OPHTHALMIC SOCIETY.

November 5, 1914.

Dr. Wendell Reber exhibited a case which when he first saw it presented some of the characteristics of trachoma and vernal conjunctivitis. Both lids were filled with granules, but on closer inspection there were a great many flattened, pavement-like granules resembling what the dermatologists call plaques. The suggestion of iridescence in the conjunctiva was unmistakable. The condition had existed for 9 years without the slightest involvement of either cornea, the patient being 19 years of age. The granules were almost cartilaginous in texture and a very fine false membrane could be detached from among them at almost any time, so that it was easy to pull out stringy or elastic secretion that by certain authorities is held to be characteristic. The patient had practically no scratchy sensation from the large pavement-like granules. Mitigated copper stick with copper citrate ointment at night as a therapeutic test aggravated the condition. A two-grain to the ounce solution of copper sulphate has proved more efficacious than any other application in this case.

Dr. Reber presented the case particularly for the purpose of differential diagnosis between vernal conjunctivitis, which he thought this case illustrated, and trachoma, which was the subject for discussion at the meeting.

Trachoma in Pennsylvania—Dr. Clarence P. Franklin (by invitation).

Dr. Franklin said that the status of trachoma under the law of Pennsylvania made it a reportable disease, but that difficulties in diagnosis caused much laxity in reporting trachoma as a contagious disease. There are many cases existing in the state unreported. The law makes no provision for care or segregation after the disease is reported.

He spoke of the scope of the work of the Health Department looking to eye examinations to find trachoma and the subsequent care of the disease, and he gave a sketch of the system in use in England at present, which consists of school-homes to continue the education of children who have trachoma, while under public care and treatment.

There has been a plan advocated by the Commission of the Conservation of Vision for an initial School-Home Hospital, located near Pittsburgh, as a center of greater density of trachoma cases among the foreign-born coal and iron mining population. This plan is in temporary abeyance, awaiting the result of a conference among all those interested, both sociologically and medically, looking toward the introduction of a bill into the next legislature requiring all hospitals receiving state aid to open their doors to cases of trachoma, gonorrhœa, syphilis and tuberculosis.

Dr. William Zentmayer spoke upon the "Differential Diagnosis of Trachoma." In the first stage of the disease it might be mistaken for follicular conjunctivis. In the second stage the affections with which it might be confounded are vernal conjunctivitis, Parinaud's conjunctivitis and tuberculosis of the conjunctiva. In the third stage there is a resemblance to pemphigus of the conjunctiva and to the shrinking of the conjunctiva following burns.

According to Axenfeld the finding of Prowaczek-Halberstaedter inclusion bodies in a case of follicular affection of the conjunctiva would strengthen the diagnosis of true trachoma, but their absence would not exclude trachoma.

Treatment of Trachoma.—Dr. Luther C. Peter.

Dr. Peter feels that our state laws are inadequate to meet our needs in the prophylactic treatment of trachoma. The following-up treatment should be rigidly enforced after the patients leave the hospital, and ambulant cases should be instructed as to the

dangers of infecting those about them, also as to the necessity for using their own washing utensils, linens, etc.

The first indication of trachoma, the infection, is best treated by simple, non-irritating collyria, such as boric acid wash and normal saline, rather than strong antiseptic solutions such as bichloride of mercury. Nitrate of silver should be applied to the lids daily by the surgeon to relieve the inflammatory symptoms, supplemented at home by 10 to 20 per cent. argyrol solution. No operations are indicated in this stage other than canthotomy to relieve the blepharospasm and pressure.

The second, or beginning cicatrical, state is best treated by copper crystals applied to the everted lids once in 48 hours. This may be supplemented by home use of citrate of copper ointment, increased from 5 to 15 per cent. Surgical interference hastens recovery at this stage. The pricking of each follicle by a sharp bistoury, or Beers' knife, followed by a careful expression of the follicles with a suitable roller forceps, under general anæsthesia, accomplishes a maximum result with a minimum amount of damage to the tissues. After operation the copper treatment should be again resumed. Dr. Peter has found the use of glycerite of tannin, followed by the dusting of an iodine bearing powder, such as aristol, valuable in the final stages of the disease. They are also applicable in the acute stages when acute inflammation has disappeared and the patient shows signs of recovery.

The third, or cicatrical, stage is largely the treatment of the sequelæ of the disease and is therefore largely surgical.

Treatment of pannus, in a majority of instances, when the pannus is of mild degree is that of the general treatment of trachoma. It usually disappears with the disappearance of other symptoms.

Severe forms may require more heroic treatment, such as peritomy, and when the corneal tissue becomes the site of ulceration, treatment suitable to the condition should be employed.

Four points should be emphasized in the treatment of trachoma:

1st. The use of mild collyria, rather than strong mercurial washes.

2nd. The employment of such surgical operations, when indicated, as will bring about a maximum result with a minimum damage to the tissues.

3rd. Most careful refraction of trachomatous patients after recovery.

4th. A following-up system should be practiced so as to insure complete cure.

DISCUSSION.

Dr. William Campbell Posey said he had seen two or three cases similar to that shown by Dr. Reber and even a little more marked and where the follicles were harder. There was no question of the uselessness of rolling in the cases referred to, the only thing to do was to pare them down with a very sharp follicle knife. Until they were pared down they irritated the cornea.

He said the differential diagnosis of trachoma is simple enough. In vernal conjunctivitis the cornea is usually clear, while the conjunctiva is characterized by a milky-white haze. Dr. May has thought that cases like this one of Dr. Reber's, and the ones I referred to, represented a mixed type; but I think they are cases of vernal conjunctivitis which have persisted for some years. The granules are so hard that the cold weather does not affect them.

Within the last week I had a young man sent to me with inflamed eyelids. On first looking at the lids I thought it was trachoma. The young man had adenoids, and evidences of inflammation of the lymphatic system. Although the inflammation had persisted for a number of years the cornea was clear and the granules were in ridges. The man was under 20 years of age. The adenoids were taken out, the lids were rolled, and treatment was about the same as that outlined by Dr. Peter.

If possible children with trachoma should be sent to a trachoma school, but you cannot do that with adults. It is a very difficult sociological problem. Say a man has a large family, what are you going to do with him, for after three or four weeks of hospital care he must be turned loose. His family must be cared for. To my mind the thing to do would be to have the social worker go to his house and show him how to live, and also go to his place of business and explain to his fellow-workers the danger this man may be to them. There must be better housing conditions for men afflicted in this way. The best plan would be to send these men and their families to a detention hospital and let the men go out and work, while the families were cared for; but that, of course, is an expensive plan. The best

thing is to open the wards of some hospitals to this class of cases. The development of the social service system will see that these cases are taken care of.

December 10, 1914.

SYMPOSIUM ON DISEASES OF THE PITUITARY BODY.

The Ocular Symptoms.—Dr. William Campbell Posey.

Dr. Posey said that owing to the intimate anatomical relationship which exists between the pituitary body and the optic and motor nerves of the eye, the ocular symptoms are the most frequent and important of the neighboring symptoms of diseases of that body. Exophthalmus, though infrequent, sometimes occurs, and they may be attributed perhaps to a lymphatic stasis in the tissues of the orbit. If there be complete bitemporal hemianopsia, the Wernicke pupillary inaction sign may be demonstrated. The ophthalmoscopic signs are pallor of the optic nerves, with diminution of the blood current, followed later by pronounced simple atrophy. Choked disc occurs in the later stages in a few cases where intracranial tension is much increased. The most instructive changes are in the visual fields. While it was formerly thought that bitemporal hemianopsia was diagnostic, it is now held that scotoma, homonymous hemianopsias, and even slight cutting in the temporal fields are of no less significance. Great stress was laid upon the importance of recognizing cutting in the color sense in the upper, outer field of vision. Scotomas, paracentral in type, symmetrical in the two eyes or not, are of great significance. The field in one eye is usually much more compromised than in the other. Great variations occur in the field from day to day, according to the changing of pressure exerted upon the optic nerves within the brain.

Dr. Posey dwelt upon a diminution of the light sense due to involvement of the axial fibres of the optic nerve, as a symptom of great importance. Homonymous hemianopsia is explained by an extension of the diseased process backwards and the involvement of the tract. Binasal hemianopsia sometimes occurs, but in rare instances, and illustrates how varied the pressure may be upon the chiasm and optic nerves. Involvement of the motor nerves of the eyes occurs, but is infrequent.

The Nervous Symptoms.—Dr. John H. W. Rhein.

The symptoms of diseases of the pituitary body are interesting to the neurologist chiefly because this organ is connected with the brain and produces symptoms referable to the nervous system by reason of pressure upon the neighboring parts rather than for nervous symptoms which disorders of the gland itself may cause. Dr. Rhein divided the symptoms into three groups, namely: hyperpituitarism, hypopituitarism and dyspituitarism. Typical examples of hyperpituitarism or hypopituitarism are rare, one condition overlapping the other and giving rise to a syndrome which is best described as dyspituitarism. Cushing classifies the states of dyspituitarism into five groups, namely: "Group 1. Cases of dyspituitarism in which not only the signs indicating distortion of neighboring structures but also the symptoms betraying the effects of altered glandular activity are outspoken. Group 2. Cases in which the neighborhood manifestations are pronounced but the glandular symptoms are absent or inconspicuous. Group 3. Cases in which neighborhood manifestations are absent or inconspicuous though glandular symptoms are pronounced and unmistakable. Group 4. Cases in which obvious distant cerebral lesions are accompanied by symptomatic indications of secondary pituitary involvement. Group 5. Cases with a polyglandular syndrome in which the functional disturbances on the part of the hypophysis are merely one and not a predominant feature of a general involvement of the ductless glands."

In a study of 169 cases vertigo was mentioned in 10 per cent. of the cases. Roth, however, in a statistical study found vertigo present in about 30 per cent. of the cases. Vomiting is a comparatively frequent symptom and occurs in 20 to 40 per cent. of the reported cases.

The symptoms referable to the visual apparatus briefly consist of disturbances of the field of vision, occasional oculomotor involvement, nystagmus, exophthalmus, ptosis and photophobia.

Other cranial nerve involvement is rare. There are, however, a few cases on record in which the facial nerve is paralyzed in some instances.

It may be said further that the increase in the fat deposit is due to deficient posterior lobe secretion. Wakefulness, excitability and irritability point to hyperpituitarism; drowsiness and convulsions, to hypopituitarism. Hyperpituitarism produces giantism and acromegaly. Hypopituitarism produces adiposity,

failure of development and sexual infantilism in childhood, and in adults sexual infantilism of the reversive type.

The Medical Treatment.—Dr. Wendell Reber.

Two years ago (in Scranton) I spoke of a case of pituitary disease that had increased to the point of hemianopsia and who declined operation. The patient was then put upon thyroid extract and pituitary substance and regained full visual fields. I called attention to the fact at that time that inasmuch as there were certain cases which spontaneously ruptured it is quite possible that there were other cases. In view of these facts it seemed to me wise to exhaust medical measures before resorting to surgical measures. Hirsch reports 3 in 9 cases operated on, who died. Waldeck reported a case last year treated by organotherapy in which full fields had been gained and full visual functions. So that it seems to me it is well worth our while to consider the possibilities of organo-therapy.

In the early part of this year I saw a case which at first presented the clinical features of chronic non-inflammatory glaucoma. I studied this case very carefully and for a long while. The fields are extremely interesting in that they offer the bi-nasal rather than the bi-temporal phase, which would favor the diagnosis of glaucoma. There was a small island in the center of the field of the right eye; in the left eye there was a little central field and then an island. Corrected vision equalled 6/5. There was a saucer of the nerve with a slight undermining of the edge of the disc. I finally advised against operation and put him on miotic treatment and elimination. The case was later exhaustively studied by Dr. Weeks, of New York, and we both came to the same conclusion, that it was probably a case of mixed picture or disease of the pituitary body.

I feel that we are not simply justified but absolutely called upon, where the symptoms are not too urgent, to first exhaust medication including every possible form of organo-therapy before counselling resort to surgery.

DISCUSSION.

Dr. William Zentmayer said that he should like to emphasize the point brought out by Cushing, that homonymous hemianopsia occurs with greater frequency in these cases than is generally supposed. The explanation given by Cushing of the apparent preponderance of bi-temporal hemianopsia being that this defect

is the one for which cases are referred to those particularly interested in conditions about the hypophysis. Another important point in connection with field defects is that the cases which ultimately become bitemporal hemianopsic often early show symmetrical contraction of the upper outer boundary. Dr. Zentmayer referred to a case in which the deep-seated nasal pain was the cause of the case being mistaken for one of intra-nasal disease. A feature of importance in hypophyseal disease is the fluctuation which occurrs in the symptoms. A symptom that he had not here heard touched upon was the early cessation of menstruation. Referring to the rarity of muscular palsies Dr. Zentmayer stated that in one case he had seen there was a unilateral paresis of accommodation.

Dr. T. B. Holloway: As to the prevalence of exophthalmos in association with pituitary lesions, Dr. Holloway stated that he had seen one case and in this the exophthalmos was but slight. Uhthoff in his statistics credits exophthalmos with being present in eight per cent. of the cases. Uhthoff has suggested a sympton that has not been mentioned, that is a recurring congestion of the bulbar conjunctiva, which he is inclined to attribute to associated thyroid trouble, and believes that the congestion is dependent upon vaso-motor disturbances. What Dr. Reber has suggested as a possibility, had actually occurred in a case that had recently came under Dr. Holloway's observation, showed field changes characteristic of pituitary body disease, and the X-ray findings, sugar tolerance, and other phænomena all pointed unquestionably to the existence of a pituitary lesion. From the appearance of the discs alone, the diagnosis of chronic glaucoma was not unjustifiable. He thought it possible that the symptoms of sinus disease might be superimposed upon the other symptoms owing to the breaking through of a tumor and the encroachment made upon the adjacent cells. In reference to the field phænomena, this would depend upon the portion of the tract compressed. Dr. Holloway then referred to the relation of the circle of Willis to the visual tract and referred to the possibility of vascular constriction in tumor of the base and frontal lobes. In several cases he had observed, after operation by Dr. Frazier through the fronto-orbital region an impairment in upward rotation on the operative side, but this promptly subsided and in no instance had he seen it persist as an enduring symptom.

W. Walter Watson, M.D., Secretary.

ROYAL SOCIETY OF MEDICINE.

Section of Ophthalmology.

A meeting of the Section was held on the 4th of November under the presidency of Mr. Priestley Smith.

Dr. A. Hugh Thompson showed a case of dilated pupils of the Argyll-Robertson type with well-marked contraction on attempted closure of the lids. He also showed a case of one-sided internal ophthalmoplegia in which no cause had been found.

Mr. N. Bishop Harman showed a case of congenital entropion, and read notes of a case of high myopia in an infant.

Mr. W. H. Jessop showed a case of lymphangioma of the lowed lid.

Mr. H. L. Eason showed a case of confluent tubercle of the iris in which perforation had begun in the fifth week of the disease and in which tuberculin had proved of no use.

Mr. A. H. Payan Dawnay showed a case of metastatic intraocular carcinoma.

Mr. W. T. Holmes Spicer read a paper on cysts in the anterior chamber arising from the pars ciliaris retinæ. The case had been under observation for seven years. The first appearance was that of a white spot at the edge of the pupil when the patient was three months old. When the patient first came under observation at the age of sixteen months there were three opaque finger-shaped masses coming into the anterior chamber from behind the iris. Four years later these had disappeared and a cyst about 4 mm. in diameter was seen floating freely in the anterior chamber. Other cysts appeared later and finally there were seven, floating like toy balloons in the anterior chamber. The eye was now removed owing to the formation of a ciliary staphyloma and the development of glaucoma. On examination the cysts were found by Mr. Greeves to consist of embryonic retinal tissue containing vitreous. They started in the pars ciliaris retinæ and there was a resemblance to glioma tissue in many places in the walls of the cysts.

ABSTRACTS FROM MEDICAL LITERATURE.

By W. F. Hardy, M.D.,
St. Louis, Mo.

METASTATIC CHOROIDITIS.

(Report of a Case with Streptococci in the Vitreus.)

Edward Stieren (*Penn. Med. Jour.*, July, 1914) reports a case of metastatic choroiditis occurring in a woman of twenty-five who had suffered a probable early miscarriage. She was taken violently sick with abdominal tenderness, rigidity and distension. Leucocyte count 12000. There soon appeared on the face and extremities a papular rash which became pustular in twenty-four hours, the pus from which was loaded with short and long streptococci. About the same time the eyelids and conjunctiva became œdematous and congested. On the sixth day a yellow reflex was obtained from the vitreus. Patient then moribund, temperature 105°, pulse 170. A few drops were aspirated from the left vitreus and found to contain numerous streptococci similar to those found in the pustules. Metastatic suppurative choroiditis in pyæmia is stated to be a rare condition, and when bilateral is invariably fatal. It is usually impossible to demonstrate the organisms in the eye after death, as they disappear rapidly.

BLINDNESS CAUSED BY OPHTHALMIA NEONATORUM.

Richard J. Tivnen (*Jour. Am. Med. Assn.*, November 14, 1914), writing on this apparently threadbare topic, states that no writer can be charged with unseemly reiteration or boresome repetition, no matter how often or insistently he dwells on this painful humiliating truth, namely, that the vast majority of children could have been spared their affliction by simple precautions at the proper time. Statistics go to show that from 25 per cent. to 50 per cent. of cases of blindness, where the blindness is preventable, is due to ophthalmia neonatorum. Tables are given for the large eye clinics and schools for the blind. The economic side of the question is considered. It is estimated that it costs the state $3,000 to educate a blind child, to which sum must be added the loss to the individual in earning capacity.

"As far as the treatment of the disease itself is concerned, the recognized procedures all have this in common, namely to negative the action of the invading organism, to keep the eye freed from the purulent secretion, to anticipate corneal involvement, to assist the reparative process and prevent the spread of the infection." The field of greatest opportunity lies in prevention by prophylaxis and early recognition and prompt treatment. The plan for the suppression of infant ophthalmia as described by the New York Association for the Blind, is summed up as follows: 1. Educational through printed matter, lectures, addresses, exhibits, the aid of the press, etc. 2. Legislative. 3. Co-operation of medical societies, health officers, ophthalmic, maternity and other hospitals, clinics, missions, schools and district visiting nurses.

OPHTHALMOLOGY DURING THE YEAR 1914.

Dunbar Roy (*The Medical Times,* January, 1915) states that no marked advancements have occurred in ophthalmology in 1914, either from a therapeutic or surgical standpoint. Three subjects have claimed attention and received more discussion than others.

1. Glaucoma.—The main point of discussion has been concerning the newer operations. The real pathology has not been solved. Schiotz tonometer has aided in early and doubtful diagnoses, although Orr and Wessely doubt the exactness and precision of the instrument. De Schweinitz is quoted as stating that the modern operations have turned the scale in favor of an early operation for glaucoma. Elliot's operation seems to meet with most favor, although a number of late infections have been reported. Mellers' figures seem to favor Elliot's operation over that of LaGrange, though Mellers' statistics did not take into consideration late infection following the Elliot procedure.

2. Cataract.—The question of the surgical removal of senile cataract has been prolific of much discussion. Major Smith and his followers have been enthusiastic for the intracapsular operation, whereas most others while considering it an ideal operation do not think it applicable as a general thing to American patients. Two cases of spontaneous resorption of senile cataract have been reported and further experiments along the lines of non-operative treatment. Meyer Steineg has reported good results in improving vision by the daily instillation in the eyes of a ¼ to ½ per cent. solution of either iodide of potassium or dionin.

3. Vaccine therapy.—This has been much used during the last year. Its chief exponent being Rohmer. Tuberculin has been extensively used. Issue has been taken by Theobald and others with the tuberculous theory of phlyctenular disease. The younger or experimental school of ophthalmologists adhere to the tuberculous theory. The question is still undecided. The use of salvarsan and neosalvarsan has received much attention. The efficiency of these drugs in parenchymatous keratitis has been discussed, and Roy states that he has obtained far better results than was possible with iodides and mercury. Especially were the symptoms of pain and photophobia speedily relieved and a rapid improvement was noted in almost every case, but only after three or four injections had been given. Neosalvarsan is by no means so efficacious.

The question of sympathetic ophthalmia has received mention. Observers are still divided as to the genesis of the affection. F. Duetschmann has brought forward some other experiments to show the theory of Leber and R. Duetschmann is correct. He believes that it is a migrating ophthalmia dependent upon the passage of the Gram-positive diplococcus to the sound eye by the route of the optic nerves and chiasm. It will be some time before this theory is universally accepted.

Mention is made of new instruments and of the death of several noted ophthalmologists.

THE MENDELIAN LAW AND ITS RELATION TO INHERITED CONDITIONS OF THE EYE.

B. F. Church (*California State Journal of Medicine*, December, 1914) explains the meaning of Mendel's Law and shows its relation to inherited conditions of the eye. As expressed by Bateson, the essence of the Mendelian principle is, first, that in a great measure the properties of organisms are due to the presence of distinct detachable elements separately transmitted in heredity, and secondly, that the parent cannot pass on to the offspring an element which it does not itself possess. Each germ cell, ovum or sperm may contain or be devoid of any of these elements; and since all ordinary animals and plants arise by the reunion of two germ cells in fertilization, each resulting individual may obviously receive in fertilization similar from both parents, or from neither; in these cases the offspring is "pure" bred for the presence of the character in question or for its absence. But it may be formed by the union of dissimilar germs, one contain-

ing the element, the other devoid of it. In this case we call the individual cross bred, or heterozygous, in that respect.

In many of the definite and hereditary diseases and malformations follow one or the other of the systems with which Mendelian analysis has familiarized us, dominants or recessives.

Among conditions showing a dominant Mendelian inheritance may be mentioned various bony and cartilaginous malformations, several varieties of skin and nervous diseases, pre-senile cataract, strabismus, ectopia lentis, coloboma, distichiasis, night blindness and retinitis pigmentosa. It is characteristic of them that unaffected members of the families do not transmit these defects. In the human examples the individuals affected are almost always heterozygous and hence among the children born to their marriages with normal persons we expect to find the affected and unaffected to be in equal numbers. Church's observations lead him to believe that strabismus or the conditions which produce it, is always a dominant hereditary character.

Of recessive conditions in man we have less abundant evidence. It is fairly well established, however, that feeble-mindedness, paralysis agitans, albinism, myoclonus epilepsy and alcaptonuria come under the head of recessives. Albinism acts as purely a recessive character both in man and in other animals. An albinic mated to a normal individual will have no albinic offspring. The children of this mating, however, would have the germ plasm with respect to albinism and in cousin marriages might produce some albino children. In an entirely different group the descent of abnormality is limited wholly or in part by sex, such as color blindness, hæmophilia and one of the forms of nystagmus. Color blindness affects males with much greater frequency than females. It is transmitted by women to their sons, but is rarely, if ever, transmitted by the father. Daughters of color blind fathers inherit it though it does not appear in them, but they may transmit it to their sons. Sons of color blind women will all be color blind. Church makes the surprising statement that only seven cases of color blind women are known in the world. They had seventeen sons, all color blind. Sons of color blind father and normal mother will be absolutely free from the defect and cannot produce color blindness in any of their offspring when mated with a normal strain. Naudin characterized the individual as a living mosaic. The idea of unit characters capable of being inherited independently of one another, is one of the most important conceptions of the science of biology, the direct result

of Mendel's work. Formerly it was believed that individual traits would become attenuated, blend and be lost in the melting pot by repeated union with uncontaminated stock. We know that the unit characters do not blend; that after a score of generations a given characteristic may appear wholly unaffected by repeated union with foreign germ-plasm.

OCULAR ANGIOSCLEROSIS.

Ocular angiosclerosis is described by Geo. H. Kress (*Ophthalmoscope,* December, 1914) as a term to indicate the hardening or overgrowth of connective tissue of the walls of the bloodvessels of the eye. The close association of sclerosis of the vascular system with over-eating, high-tension living, alcohol and syphilis is noted. It has an intimate connection with chronic nephritis either as a precursor or as a corollary. It is almost a constant accompaniment of old age and often manifests itself after the age of forty, and may be an early symptom when there are but few other clinical symptoms of arteriosclerosis elsewhere. It may therefore give us an opportunity of attacking the condition or rather the underlying faults before it has gone on to frank or terminal stages, thereby prolonging life. Hirschberg is quoted as having found evidence of angiosclerosis (retinal) in 50 per cent. of a series of cases of old persons coming to him for refraction. According to Hertel the percentage was even higher. Hypertension is a frequent concomitant of angiosclerosis and should be sought for and estimated in patients over forty coming to an eye specialist. It may enable us to guard against glaucoma. Its connection with cataract has been noted and it should be reduced before cataract operation. As the same time blood pressure readings are taken the intraocular tension should also be recorded. The normal and morbid anatomy of the retinal bloodvessels is given. As a result of the morbid changes, the eye tissues are supplied by bloodvessels with narrowed lumena and bathed with blood containing the toxic elements lying at the root of the sclerosis. Consequently the nutrition and metabolism of the retinal and other ocular tissues suffers. The vessel walls are weakened, have a tendency to leak and be thus responsible for hæmorrhagic spots in the retina. Sudden lowering of vision does not usually occur except from occlusion of the lumen of a central vessel or from a sudden intraocular hæmorrhage. The clinical stages of systemic angiosclerosis is defined as incipient, intermediate and terminal. Patients seen in the last stage may

show a steadfast hypo—succeeding a previously persistent hypertension. In the eye we are dealing with terminal or end arteries, so that endovascular irritants have full opportunity to make their power felt. Among subjective phenomena are early decrease in the accommodation and severe headache, persisting after refraction has been corrected at the onset of presbyopia. Of the objective signs to be noted are, arcus senilis, slow reaction of the pupil, hyperæmic optic disc of dull red color, œdema of retina in patches near the disc or bloodvessels. In the arteries themselves there is seen a tendency to a cork screw course; there is a seeming increase in the number of smaller retinal arteries; pressure effects are noted; strapping of veins by the arteries occurs. An increase in the brightness of the light streak produces the so-called "silver wire" appearance. There may also occur a decrease in the color and translucency of the vessel walls, a locomotion or arterial pulse, venous pulsation, a diminution in the calibre of arteries, a hazy appearance about the optic disc, and hæmorrhagic spots near the vessels, ranging from dots and short streaks to real blotches of hæmorrhage. These changes may involve veins as well as arteries, but may be almost limited to the veins. If the vein walls weaken only in spots, then in lesser degree the veins may show the bulbous varicosities seen in other parts of the body.

In regard to treatment, the early detection of vascular sclerosis is of paramount importance, necessitating emphasis on the hygiene of living. Such patients should lead a life of moderation in work, in eating, in exercise and in personal habits. Elimination by bowels, kidneys, skin and respiratory tract should receive constant attention. Among drugs iodides take first rank; while symptomatically the nitrites and sedatives, like the bromides, may be of value. The elimination of the underlying causes of the sclerosis is of course of the greatest importance.